REMARKS

In order to more particularly point out and distinctly claim the subject matter regarded as the invention, claims 1 and 6 have been amended to recite that the amorphous iron-based alloy exhibits a linear BH characteristic within an applied field ranging from about -15 Oe to +15 Oe. The amendment to claims 1 and 6 is clearly supported by the original specification, e.g. at page 7, lines 20 – 23; and Fig. 1. Consequently, no new matter has been added by way of this amendment.

The instant specification has been amended to set forth two related applications which were filed of even date with the instant application. Both the applications are commonly owned by the assignee of the instant application.

The present invention provides a magnetic alloy having enhanced magnetic properties that render it particularly well suited for use in the magnetic cores of devices such as current/potential transformers. The combination of a linear BH loop characteristic over a wide range of applied field and low core losses allow construction of a core, which in turn provides a significant enhancement of the accuracy and reliability of a current/potential transformer. Such components are widely used for measurement of current and potential. Use of a current/potential transformer permits the measurement circuitry to be electrically isolated from the actual circuit being measured, so that high voltage, high current measurements can be made safely and conveniently. For example, these measurements are essential for both metering and control of the electric power distribution grid. The present alloy represents a significant improvement for these essential capabilities.

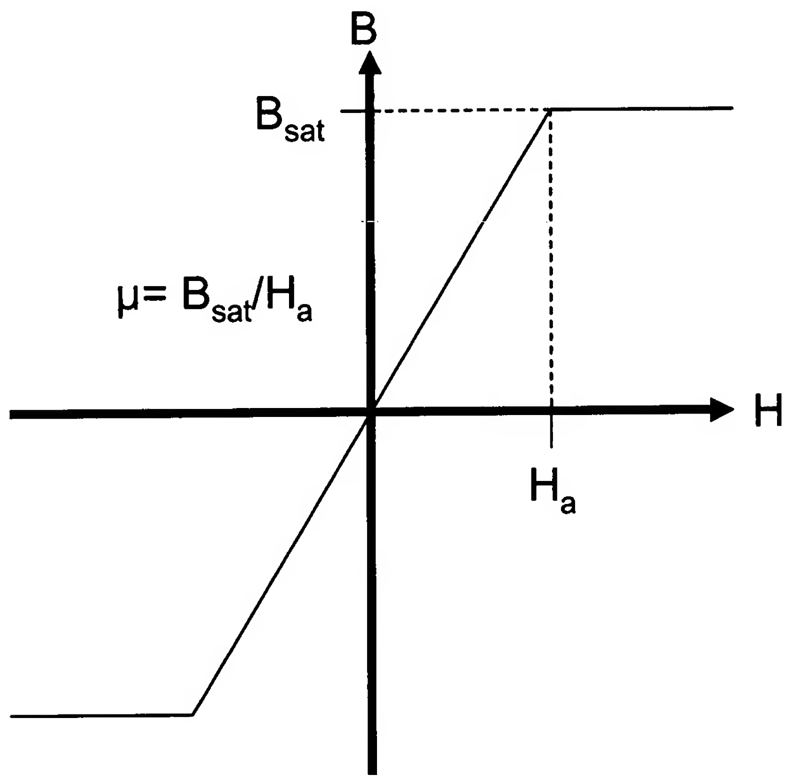
Appreciation is expressed for the Examiner's withdrawal of the previous rejection of claims 1 – 10 under 35 USC 112, second paragraph.

Claims 1 – 10 were rejected under 35 USC 102(b) as anticipated by, or, in the alternative, as obvious over, US Patent 5,110,378 to Hasegawa et al.

Hasegawa et al. discloses a metallic glass having high permeability, low coercivity, low ac core loss, low exciting power, and high thermal stability. The alloy is said to be useful in fabricating magnetic cores suited for applications such as current/potential transformers that provide a linear output over a wide range of applied fields. Applicants maintain that the Hasegawa et al. reference does not disclose a magnetic alloy having a linear BH loop characteristic. As delineated by applicants at page 7, lines 20 – 23; and page 8, lines 1 – 2, a linear BH loop characteristic means a linear magnetic permeability, over a wide range of applied field, e.g. an applied field ranging from about -15 Oe (-1200 A/m) to +15 Oe (+1200 A/m). By way of contrast, Hasegawa et al. does not disclose any material having a linear BH loop characteristic over a range of applied fields at all approaching the ±15 Oe range provided by the present alloy. Instead, the permeability values are said to be at least 40,000 and vary by no more than a factor of three for applied fields ranging from 0.4 to 10.0 A/m. Moreover, the lowest permeability disclosed by Hasegawa et al. is more than 19,000. One of ordinary skill in the art would recognize that such an alloy would not maintain a linear BH loop characteristic for an applied field ranging from about -15 Oe to +15 Oe, since the magnetic material would be substantially fully magnetically saturated at a saturating applied magnetic field much lower than 15 Oe. For applied fields stronger than the saturating field, the BH loop is saturated. Consequentially, permeability falls rapidly and the linear characteristic is no longer extant. As a result, it is submitted that Hasegawa et al. fails to disclose or suggest the alloy delineated by present claims 1 – 10. Any current/potential transformer constructed using magnetic alloy disclosed or suggested by Hasegawa et al. would fail to operate satisfactorily over the wide

range of applied fields afforded by a transformer constructed using the alloy of present claims 1 – 10.

More specifically, there is depicted below for illustrative purposes an idealized BH loop of an amorphous metal alloy showing linear behavior:



The BH loop depicted exhibits a linear behavior for values of applied field H at substantially any point in the range between $-H_a$ and $+H_a$. At these extremes of H, the magnetic induction B takes on values of $-B_{sat}$ and $+B_{sat}$, respectively. The value of B_{sat} is determined almost entirely by the chemical composition of the amorphous metal alloy, while the value of H_a is extrinsic and largely dependent on the specific details of the thermomechanical and magnetic processing of the given material. For values of applied field H above H_a, the material is fully saturated magnetically and

linear behavior is no longer present. The loop is characterized by a permeability $\mu = B_{sat} / H_a$ for B and expressed in units of gauss and oersteds, respectively. As can be inferred by rearrangement of the permeability equation, a magnetic core with material having a given constant value of permeability μ_{max} can exhibit linear behavior only for fields within the range $-H_{max}$ to $+H_{max}$, where $H_{max} \leq B_{sat} / \mu_{max}$.

As noted above, the lowest value of permeability disclosed by Hasegawa et al. is greater than 19,000, and the values B_{sat} disclosed (in Table III) range from about 10,700 G (1.07 T, for $Fe_{72}Mo_6B_{18}Si_4$, Table III) to 15,200 (1.52 T, for $Fe_{78.5}Zr_{1.5}B_{17}Si_3$, Table VII). As a result, it can be concluded that no Hasegawa et al. alloy exhibits linear BH behavior for a field above H_{max} = 15,200/19,000 = 0.8 Oe ≅ 64 A/m. In practice, the Hasegawa et al. alloys exhibit linear BH behavior over an even smaller range of applied field, as evidenced by the fall in permeability with applied field that is already seen in the data of Table at a value of applied field of 4.8 A/m = 0. 6 Oe. (Values of applied field may be converted using the conversion factor that 1 Oe ≅ 80 A/m).

Applicants thus respectfully submit that the present magnetic magnetic alloy, as delineated by amended claims 1 and 6 (and claims 2 – 5 and 7 – 10 dependent thereon), exhibits linear behavior over a far wider range of applied magnetic fields than any alloy disclosed or suggested by Hasegawa et al. For these reasons, it is submitted that claims 1 –10, as amended, patentably define over the Hasegawa et al. disclosure.

Accordingly, reconsideration of the rejection of claims 1 – 10 under 35 USC 102(b) as being anticipated by, or in the alternative, under 35 USC 103(a) as being obvious over US Patent 5,110,378 to Hasegawa et al., is respectfully requested.

For the reasons set forth above, it is submitted that the amorphous iron-based alloy delineated by amended claims 1 – 10 is patentable over the art applied, and that the present application is in allowable condition. Reconsideration of the rejection of present claims 1 – 10 and allowance of this application are therefore earnestly solicited.

Respectfully submitted,

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